

# Trans fatty acids and coronary heart disease

*Food labels should list these as well as cholesterol and saturated fat*

A recent systematic review by Mozaffarian and colleagues in the *New England Journal of Medicine* advocated that people should reduce or stop their dietary intake of trans fatty acids to minimise the related risk of coronary heart disease.<sup>1</sup> Trans fatty acids—unsaturated fatty acids with at least one double bond in the trans molecular configuration—are produced by partial hydrogenation of vegetable oils. This is a process that converts vegetable oils into semi-solid fats which have no known nutritional value but are widely used in margarines, in commercial cooking, and in manufactured foods.<sup>2</sup>

Reliable evidence for the effects of trans fatty acids and other types of fat on blood lipids comes from the “metabolic ward” studies (in which participants are admitted to wards specialising in metabolic studies). Typically, participants in these studies consumed isocaloric diets under controlled conditions that exchanged the amount and type of fat for complex carbohydrate and the effects on participants’ blood lipids were then measured. These trials showed that increasing intakes of saturated fat, trans fat (trans fatty acids), and dietary cholesterol raises total cholesterol and low density lipoprotein (LDL) cholesterol concentrations; polyunsaturated fats lower LDL concentrations; monounsaturated fats have a neutral effect on LDL; and eliminating trans fatty acids from the diet reduced total cholesterol by 0.1 mmol/L.<sup>2-4</sup> Recent evidence on the relation between dietary trans fatty acids and blood lipids has shown that trans fatty acids increase LDL and reduce high density lipoprotein (HDL) cholesterol concentrations. Compared with equivalent changes in intake of saturated fats, intake of trans fatty acids has a more adverse effect on the ratio of total cholesterol to HDL cholesterol concentrations.<sup>1 2</sup>

The review by Mozaffarian and colleagues included a meta-analysis of prospective studies of trans fatty acids and risk of coronary heart disease. A 2% increase in the energy intake from trans fatty acids was associated with a 23% increase in the incidence of coronary heart disease (pooled relative risk 1.23; 95% confidence interval 1.11 to 1.37).<sup>1</sup> The authors noted that the adverse effects of trans fatty acids were seen even when intake was really low, only 3% of total daily energy intake (20–60 calories), about 2–7 g for a person consuming 2000 calories (8.37 MJ) per day.

Legislation introduced in Denmark in 2004 mandated that all oils and fats used in locally made or imported foods must contain less than 2% industrially produced trans fatty acids. This virtually eliminated trans fatty acids and had no effect on quality, cost, or availability of foods. In January 2006 the US Food and Drug Administration mandated that all food manufacturers provide the content of trans fatty acids and cho-

Average percentage of saturated fatty acid and trans fatty acid, by weight, in selected foods in the UK diet<sup>5</sup>

Food	Saturated fats	Trans fats	Both fats
<b>Spreads:</b>			
Butter	52	3	55
Hard margarine	35	12	47
Fat spreads	11	3	14
<b>Biscuits:</b>			
Chocolate caramel biscuit bar	12	5	17
Chocolate biscuit	12	2	14
Digestive plain	9	1	10
Oat and wheat bar with fruit filling	2	trace	2
<b>Savoury snacks:</b>			
Crisps	14	?	14
Cream crackers	5	1	6
Mixed nuts	8	0	8

lesterol in addition to saturated fat on nutrition labels for all manufactured foods

The UK Food Standards Agency is currently pressing for revision of the European directive that governs the content and format of nutrition labels on foods marketed in the United Kingdom and other European countries, so that these fats are labelled. The trans fatty acid content of commonly used, randomly selected foods consumed in the UK up to 2002 varied substantially between one type and another (table <sup>5</sup>). Some margarines may now have lower concentrations of trans fatty acids, but consumers need to know which ones to choose. Mandatory addition of the content of saturated fat and trans fatty acids to nutrition labels would enable consumers to make healthier food choices that could lower LDL concentrations and reduce the risk of coronary heart disease and other vascular events.

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